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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/507,059	09/09/2004	Hoon Choi	O-2779	8288

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EXAMINER	
BERRIOS, JENNIFER A	

ART UNIT	PAPER NUMBER
1619	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/507,059	CHOI ET AL.	
	Examiner	Art Unit	
	Jennifer A. Berríos	1619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *9/10/2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9-11,20 and 27-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7, 9-11, 20 and 27-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/10/2009 has been entered.

Maintained Rejections

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-7, 9-11, 20, 28-29 and 31 rejected under 35 U.S.C. 103(a) as being unpatentable over Shvets et al (Theoretical and Experimental Chemistry, Vol 37, No. 2, 2001, 112-115), Schacht et al (Science, Vol 273, 8/9/1996, 768-771, and Bellantone et al (US 6,482,444, filed 6/14/2000).

Regarding claims 1-4, 9-10, Shvets teaches characteristics of template formation in silica in acidic medium. Shvets teaches that the starting materials used were tetraethyl orthosilicate (TEOS) or tetrabutyl orthosilicate (TBOS), cetyltrimethylammonium bromide (CTMABr) or cetyltrimethylammonium chloride (CTMACl) and HCL to adjust the pH of the reaction medium. The composition was prepared as follows: CTMABr was dissolved in HCL and then the solution was transferred to a weighing bottle, TEOS or TBOS was added dropwise, the weighing bottle was closed and kept until the reaction was complete. Fibers first appeared after 5-12 days (depending on the room temperature). The reaction temperature affects

particularly the rate of hydrolysis of the orthosilicate and correspondingly the rate of growth of the fibers. Thus on increasing the temperature in the range of 10-24°C the induction time was reduced from 12 to 5 days and completion process from 30 to 10 days. At lower temperatures there was growth of fibers of greater diameter, greater length, and more order. It seems applicant is simple optimizing a well known process for forming silica fibers.

Although Shvets doesn't specifically teach the limitations of claims 1-4 and 9-10, since the process done by Shvets for the formation of fibers seems to be almost identical to the method of forming the fibers of the instant invention and all the same ingredients are utilized, as demonstrated by Example 1, it's expected that the properties of the fibrous preform of the instant application are also properties of the fibers created by Shvets.

It is noted that In re Best (195 USPQ 430) and In re Fitzgerald (205 USPQ 594) discuss the support of rejections wherein the prior art discloses subject matter which there is reason to believe inherently includes functions that are newly cited or is identical to a product instantly claimed. In such a situation the burden is shifted to the applicants to "prove that subject matter shown to be in the prior art does not possess characteristic relied on" (205 USPQ 594, second column, first full paragraph).

Schacht teaches oil-water interface templating of mesoporous macroscale structures. Silica fibers are created dissolving C16H33N(CH3)3Br (synonymous to CTMABr) in HCl. To this solution TEOS is added slowly over 30 min. During this time an emulsion forms. Under slow forming, predominantly fiber-type morphologies are formed (768, col 3, par. 3; 769, col 1, par 1). With increasing stirring rate, more and more spherelike particles are formed until the fiber morphology disappears completely. The size of spherical particles decreases with increasing stirring rate. The particles are

in fact hollow after the organic phase has been removed (Pg 769, par 3). It would have been obvious to one of ordinary skill in the art to modify the process of Schacht, in order to create fiber or particles, as Schacht's teaches that stirring rate can control the morphology of the fiber/particle created. Although Schacht teaches as a preferred embodiment creating particles, he does not discredit or teach away from using fibers.

These materials (i.e. the materials used to create sphere and/or fibers) have technological as well as fundamental implications. The hollow spheres, for instance, could be used for controlled drug delivery systems. The membranes might be developed further for separation processes, where nanometer-scale pores are needed (Pg 771, Par 1).

Shvets and Schacht's fail to teach the fibrous composite to comprise biodegradable polymers, a bioactive agent or to be used to deliver a bioactive agent to an animal using a controlled release delivery system.

Regarding claims 1 and 5, Bellantone discloses a bioactive, biodegradable composite material comprising a fibrous composite of oxides and biodegradable polymers, such as polylactic/polyglycolic acid, wherein fibers of the porous composite comprise gel-like oxide materials with nanometer-sized pores (Col 6, lines 36 and 60-61; Col 7, lines 23-25; and Col 8, lines 23-25).

Regarding claims 2-3, the oxides comprise SiO2 and CIO and are bioactive and capable of inducing bone-like apatite growth (Col 2, lines 51-65; Col 3, lines 46-50).

Regarding claims 6-7, 28, and 31, Bellantone discloses the inclusion of a drug or a therapeutic composition to be delivered from the fibrous porous composite at a

controlled rate (Col 7, lines 49-57; Col 15, lines 64-66). The drug or therapeutic composition can comprise bone morphogenic proteins (Col 7, lines 62-63).

It would have been prima facie obvious to one of skill in the art at the time the invention was made to combine the teachings of Schacht, Bellantone and Shvet to arrive at the instant invention. One of skill in the art would have been motivated to substitute the silica fibers taught in Bellantone for the silica fibers taught by Shvet. One would have been motivated to do so because, Schacht teaches that the materials used to create silica sphere can be used in controlled drug delivery systems. Since the starting materials of Shvet is similar to the starting materials of Schacht, it's be obvious to one of ordinary skill in the art that the silica fibers of Shvet's would also be useful for use in controlled drug delivery systems. Schacht's demonstrates that the materials used for creating silica spheres and/or fibers such as HCL, TEOS, CTMABr, have technical as well as fundamental implications and can be used in controlled drug-delivery systems. As such the resulting product from Svets, created from the starting materials HCL, CTMABr and TBOS or TEOS, can also be used fro controlled drug-delivery systems.

One of skill in the art would expect reasonable success because Shvet/Schahcts and Bellantone teach fibrous composites of oxides useful for controlled release delivery systems.

Regarding claims 11, 20 and 29 it would have been obvious to one of skill in the art that in order to deliver the bioactive agent incorporated on the fibrous composite of claim 1, the composite must be administered to the patient in need.

With regards to the limitations of effecting release of the bioactive agent in animal upon degradation of the fibrous porous composite, this is an expected property of the fibrous composite. Since the Shvet/Schacht's and Bellantone teach a fibrous porous composite similar to the fibrous composite of the instant invention, both comprising the same fibrous preform, bioactive agent and physical properties, it's expected that the composite taught by Shvet/Schachts/Bellatone would also have the same degradation properties as the composite taught by the instant invention.

Response to Arguments

Applicant argues that Schacht teaches hollow sphere and not hollow fibers , and further teaches how to eliminate any remaining fibers. While this is a preferred embodiment of Schacht's, Schacht also teaches how altering the stirring rate can change the morphology, slow stirring creates fibers and faster stirring creates particles. One of skill in the art would have the knowledge necessary to know that the process of Schacht's could be modified and fibers could be created as an end results, instead of spheres.

Applicant further states that Schacht's hollow spheres may aggregate into fibers and steps are taken to avoid such aggregates. This is not found persuasive as Schacht says that the sphere aggregate into lumps and steps can be taken to avoid such aggregates. No where does Schacht define the aggregates as fiber aggregates and steps can be taken if wanted, as such it's optional, not mandatory. The Schacht reference also does not teach that the hollow fibers cannot be made or used, and/or it doesn't discourage one of skill in the art from making and/or using hollow fibers.

Applicant further argues that although Schacht's and the instant application have similar starting material chemistry, there are major differences between the two. Firstly applicant argues that applicant use of the term "self-assembled" expressly states that no additional solvent, such as an organic solvent, as used by Schacht's needs to be added. However this is not persuasive as applicant has no definition in the instant specification of this term. Self-assembly is a term used to describe processes in which a disordered system of pre-existing components forms an organized structure or pattern as a consequence of specific, local interactions among the components themselves, without external direction (defined by Wikipedia). As such the addition of starting materials such as organic solvents would not constitute external direction. Furthermore the phrase "self-assembled" is a product by process limitations.

MPEP 2113 - "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).
...
"[T]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith." In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

It is noted that although applicant directs all arguments to both Svets and Schacht's, Applicant hasn't actually argued Svets, as all arguments are directed to

Schacht's. Examiner would like to point out, that as seen in the above rejection, the reference of Svets is used to teach the fibrous preform claimed as the process of Svets and that of the instant specification are almost identical, comprise the same starting materials CTMABr and HCL mixed together, and afterwards TBOS is added dropwise to the solution. Both are left at room temperature until fibers appeared after 5-12 days.

Schacht's is simply referred to , to demonstrate that materials used for creating silica spheres such as HCL, TEOS, CTMABr, have technical as well as fundamental implications and can be used in controlled drug-delivery systems. As such the resulting product from Svets, created from the starting materials HCL, CTMABr and TBOS or TEOS, can also be used fro controlled drug-delivery systems.

In response to applicant's arguments against the Bellantone reference individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Bellantone need not teach all the limitations of claims rejected, as the cited combined reference do teach all the limitations.

7. Claims 27 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shvets et al (Theoretical and Experimental Chemistry, Vol 37, No. 2, 2001, 112-115), Schacht et al (Science, Vol 273, 8/9/1996, 768-771, and Bellantone et al (US 6,482,444, filed 6/14/2000) as applied to claim1-7, 9-11, 20, 28-29 above, and further in view of Aloha et al (WO 97/45367).

Shvets/Schacht's/Bellantone teach all the limitations of claims 20 and 11, upon which claims 27 and 30 depend on, but fail to teach the limitations further recited by claims 27 and 30.

With respect to claims 1 and 5, Ahola et al. discloses a bioactive, biodegradable composite material comprising a fibrous composite of oxides and biodegradable polymers (polylactic acid), wherein fibers of the fibrous composite comprise gel-like oxide materials with nanometer-sized pores (pg. 5, lines 19-27; pg. 10, lines 1-10, 18-25; pg. 13, line 27 – pg. 14, line 1; pg. 14, lines 16-18).

With respect to claims 6 and 11, Ahola et al. discloses the inclusion of a drug or therapeutic composition to be delivered at a controlled rate from the fibrous composite (col. 4, lines 29-32; col. 10, lines 12-14, 26-30).

With respect to claim 7, Ahola et al. discloses the therapeutic composition comprises bone morphogenic protein (pg. 6, lines 10-11, 34-36).

With respect to claims 20 and 21, Ahola et al. discloses the drug or therapeutic composition is administered to an animal (human or animal body) at a site needed (pg. 4, line 10-12, 32 - pg. 5, line 5).

It would have been prima facie obvious to one of skill in the art at the time the invention was made to combine the teaching of Shvet/Schacht's/Bellantone and Aloha to arrive at the instant invention. One of skill in the art would have been motivated to administer the fibrous composite taught by Shvet/Schacht's/Bellantone to a human, as suggested by Aloha. One in the art would expect reasonable success because both Aloha and Shvet/Schacht's/Bellantone teach fibrous composites of oxides and

biodegradable polymers, comprising bioactive agents (bone morphogenic proteins) to be released at a controlled rate.

Response to Arguments

In response to applicant's arguments against the Ahola reference individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Ahola need not teach all the limitations of claims rejected, as the cited combined reference do teach all the limitations.

Applicant argues that the Ahola reference required "post-formulation assembly" and therefore cannot by definition be "self assembled." As such it cannot render the applicant independent claim 1 obvious. This is not found persuasive as Ahola is simply reference to provide motivation to deliver the bioactive agent to a human, using as fibrous composite.

Applicant argues that even the combine reference of Svets/Schachts/Bellantone and Ahola do not render the invention obvious. This is found unpersuasive, as discussed above, in the first 103 rejections, response to arguments.

Conclusion

8. No claims are allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Berríos whose telephone number is (571)270-7679. The examiner can normally be reached on Monday-Thursday: 7:00am-4:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler can be reached on (571) 270-0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JB

/SUE LIU/
Primary Examiner, Art Unit 1639